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**Agilent Technologies**

# ***SH-110 EXHAUST SILENCER KIT***

*INSTRUCTION MANUAL*

Part No. 699904395

Rev. A

April 2008

# ***SH-110 Exhaust Silencer Kit***

## **Warranty**

Products manufactured by Seller are warranted against defects in materials and workmanship for twelve (12) months from date of shipment thereof to Customer, and Seller's liability under valid warranty claims is limited, at the option of Seller, to repair, replacement, or refund an equitable portion of the purchase price of the Product. Items expendable in normal use are not covered by this warranty. All warranty replacement or repair of parts shall be limited to equipment malfunctions which, in the sole opinion of Seller, are due or traceable to defects in original materials or workmanship. All obligations of Seller under this warranty shall cease in the event of abuse, accident, alteration, misuse, or neglect of the equipment. In-warranty repaired or replaced parts are warranted only for the remaining unexpired portion of the original warranty period applicable to the repaired or replaced parts. After expiration of the applicable warranty period, Customer shall be charged at the then current prices for parts, labor, and transportation.

When products are used with toxic chemicals, or in an atmosphere that is dangerous to the health of humans, or is environmentally unsafe, it will be the responsibility of the Customer to have the product cleaned by an independent agency skilled and approved in handling and cleaning contaminated materials before the product will be accepted by Varian, Inc. for repair and/or replacement.

Reasonable care must be used to avoid hazards. Seller expressly disclaims responsibility for loss or damage caused by use of its Products other than in accordance with proper operating procedures.

Except as stated herein, Seller makes no warranty, express or implied (either in fact or by operation of law), statutory or otherwise; and, except as stated herein, Seller shall have no liability under any warranty, express or implied (either in fact or by operation of law), statutory or otherwise. Statements made by any person, including representatives of Seller, which are inconsistent or in conflict with the terms of this warranty shall not be binding upon Seller unless reduced to writing and approved by an officer of Seller.

### **Warranty Replacement and Adjustment**

All claims under warranty must be made promptly after occurrence of circumstances giving rise thereto, and must be received within the applicable warranty period by Seller or its authorized representative. Such claims should include the Product serial number, the date of shipment, and a full description of the circumstances giving rise to the claim. Before any Products are returned for repair and/or adjustment, written authorization from Seller or its authorized representative for the return and instructions as to how and where these Products should be returned must be obtained. Any Product returned to Seller for examination shall be prepaid via the means of transportation indicated as acceptable by Seller. Seller reserves the right to reject any warranty claim not promptly reported and any warranty claim on any item that has been altered or has been returned by non-acceptable means of transportation. When any Product is returned for examination and inspection, or for any other reason, Customer shall be responsible for all damage resulting from improper packing or handling, and for loss in transit, notwithstanding any defect or non-conformity in the Product. In all cases, Seller has the sole responsibility for determining the cause and nature of failure, and Seller's determination with regard thereto shall be final.

If it is found that Seller's Product has been returned without cause and is still serviceable, Customer will be notified and the Product returned at its expense; in addition, a charge for testing and examination may be made on Products so returned. 3/1/00

## SH-110 Exhaust Silencer Kit

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# Preface

## Documentation Conventions

This manual uses the following documentation conventions:

**WARNING**



*Warnings indicate a particular procedure or practice, which if not followed correctly, could lead to serious injury.*

**CAUTION**



*Cautions indicate a particular procedure or practice, which if not followed, could cause damage to the equipment.*

**NOTE**



*Notes contain important information.*

Before operating or servicing equipment, read and thoroughly understand all operation/maintenance manuals provided by Vacuum Technologies. Be aware of the hazards associated with this equipment, know how to recognize potentially hazardous conditions, and how to avoid them. Read carefully and strictly observe all cautions and warnings. The consequences of unskilled, improper, or careless operation of the equipment can be serious.

In addition, consult local, state, and national agencies regarding specific requirements and regulations. Address any safety, operation, and/or maintenance questions to your nearest Vacuum Technologies office.

## SH-110 Exhaust Silencer Kit

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## SH-110 Exhaust Silencer Kit

Varian's exhaust silencer kit for the SH-110 scroll pumps reduces the total sound pressure level due to exhaust pulsation, mitigates audible noise in the most sensitive frequencies, and collects tip seal dust with a 5-micron filter element.

Figure 1-3 shows the kit mounted at the exhaust of an SH-110 in the side position.

Table 1-1 breaks down the kit parts and quantities.

**Table 1-1 Exhaust Silencer Kit for SH-110, P/N: EXSLRSH110**

Part Name	Qty
Filter/ Silencer Can NW 16	1
Clamp NW16 black	1
90° elbow barb fitting 1/4" NPT x 1/2" hose	1
Centering ring	1
Tygon hose black .75" OD x .125" W x 5" long	2
Silencer/ Resonator Assembly	1
NW 16 connector .50 tubing	1
Tie Wrap	1
Mount, Adhesive Backed	1
Hose Clamp	4

Replacement polyester filter element rated 99% efficient at the 5-micron particle size, P/N: REPLSLR FILTER1.

### Installation

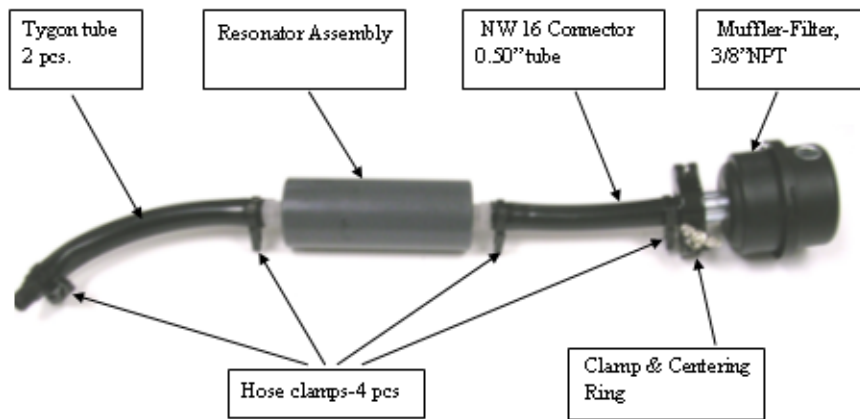


*To ensure proper operation, and to prevent damage, the kit must be installed and operated only as specified.*

To install:

1. Unscrew the 1/4" NPT coupler for the pump's exhaust (unless using the small footprint version).
2. Screw in the 1/4" NPT hose barb fitting into the 1/4" NPT female exhaust fitting.

Refer to Figure 1-1 for this procedure.



**Figure 1-1 : SH-110 Exhaust Silencer Kit: Components**

3. Connect the longer piece of Tygon tubing into the 1/2" hose end of the 1/4" NPT barb and secure with a hose clamp.
4. Connect the other end of the Tygon tubing to the 1/2" hose, 3/8" NPT barb belonging to the Resonator assembly and secure with a hose clamp.
5. Connect the second Tygon tubing to the 1/2" hose end of the 1/4" NPT barb and secure with a hose clamp.
6. Attach the smooth end of the NW16 connector to the other end of the Tygon tubing.
7. Connect the NW16 flange to the NW16 connector by the means of a centering ring and secure connection with a clamp.

Optional: if a smaller footprint is desired (Figure 1-4 on page 1-3), connect the Silencer-Filter Can NW16 connector directly to the pump's exhaust, which has an NW 16 flange, and secure it with a clamp via a centering ring.



## SH-110 Exhaust Silencer Kit

### WARNING



**Do not** use this kit if the application requires capture or containment of gases being pumped. Instead, route the pump exhaust to an appropriate collection system.

Figure 1-2 shows the kit dimensions.

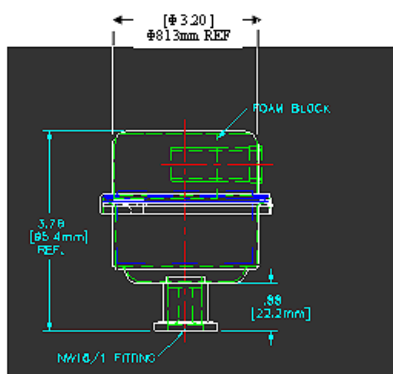


Figure 1-2 : SH-110 Silencer/ Filter Can, Kit Dimensions

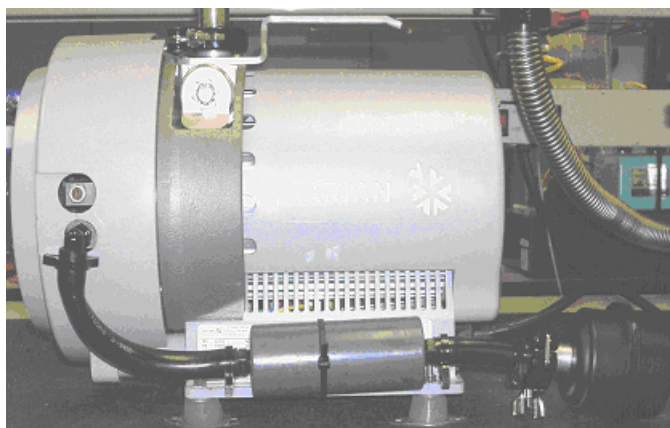


Figure 1-3 SH-110 with Exhaust Silencer Kit Installed



Figure 1-4 SH-110 with Exhaust Silencer Kit-small Footprint Version- No Resonator

### Performance

Typical reductions are: 4 dB(A) measured at 1 m from the front of the pump, on a horizontal direction and an average of 3.8 dB(A) from all three directions, under a 2-3 Torr load, and with the gas ballast open. The exhaust silencer kit does not significantly influence the sound pressure when pumping at base pressure.

The kit's silencer/resonator assembly mitigates exhaust pulsation noise in the most sensitive frequencies.

If the smaller footprint version is adopted, the silencing performance is slightly diminished, and the low frequencies are not as successfully mitigated as with the full version.

### Maintenance

Replace the 5-micron filter element after every tip-seal or module change.



1. Return authorization numbers (RA#) **will not** be issued for any product until this Certificate is completed and returned to a Varian, Inc. Customer Service Representative.
2. Pack goods appropriately and drain all oil from rotary vane and diffusion pumps (for exchanges please use the packing material from the replacement unit), making sure shipment documentation and package label clearly shows assigned Return Authorization Number (RA#) VVT cannot accept any return without such reference.
3. Return product(s) to the nearest location:

### North and South America

Varian, Inc.  
121 Hartwell Ave.  
Lexington, MA 02421  
Fax: (781) 860-9252

### Europe and Middle East

Varian S.p.A.  
Via F.lli Varian, 54  
10040 Leini (TO) – ITALY  
Fax: (39) 011 997 9350

### Asia and ROW

Varian Vacuum Technologies  
Local Office

For a complete list of phone/fax numbers see [www.varianinc.com/vacuum](http://www.varianinc.com/vacuum)

4. If a product is received at Varian, Inc. in a contaminated condition, **the customer is held responsible** for all costs incurred to ensure the safe handling of the product, and **is liable** for any harm or injury to Varian, Inc. employees occurring as a result of exposure to toxic or hazardous materials present in the product.

### CUSTOMER INFORMATION

Company name: .....	
Contact person: Name: .....	Tel:.....
Fax: .....	E-mail: .....
Ship method: .....	Shipping Collect #: ..... P.O.#: .....
Europe only: VAT Reg Number: .....	USA only: <input type="checkbox"/> Taxable <input type="checkbox"/> Non-taxable
Customer ship to: .....	Customer bill to: .....
.....	.....
.....	.....

### PRODUCT IDENTIFICATION

Product Description	Varian, Inc. Part Number	Varian, Inc. Serial Number

### TYPE OF RETURN (check appropriate box)

<input type="checkbox"/> Paid Exchange	<input type="checkbox"/> Paid Repair	<input type="checkbox"/> Warranty Exchange	<input type="checkbox"/> Warranty Repair	<input type="checkbox"/> Loaner Return
<input type="checkbox"/> Credit	<input type="checkbox"/> Shipping Error	<input type="checkbox"/> Evaluation Return	<input type="checkbox"/> Calibration	<input type="checkbox"/> Other

### HEALTH and SAFETY CERTIFICATION

**VARIAN, INC. CANNOT ACCEPT ANY BIOLOGICAL HAZARDS, RADIOACTIVE MATERIAL, ORGANIC METALS, OR MERCURY AT ITS FACILITY. CHECK ONE OF THE FOLLOWING:**

- ☐ I confirm that the above product(s) has (have) **NOT** pumped or been exposed to any toxic or dangerous materials in a quantity harmful for human contact.
- ☐ I declare that the above product(s) has (have) pumped or been exposed to the following toxic or dangerous materials in a quantity harmful for human contact (Must be filled in):

Print Name..... Signature ..... Date .....

**PLEASE FILL IN THE FAILURE REPORT SECTION ON THE NEXT PAGE**

Do not write below this line

Notification (RA) #: ..... Customer ID #: ..... Equipment #: .....



### FAILURE REPORT

(Please describe in detail the nature of the malfunction to assist us in performing failure analysis):

#### TURBO PUMPS AND TURBOCONTROLLERS

Claimed Defect	Position	Parameters
<input type="checkbox"/> Does not start <input type="checkbox"/> Does not spin freely <input type="checkbox"/> Does not reach full speed <input type="checkbox"/> Mechanical Contact <input type="checkbox"/> Cooling defective	<input type="checkbox"/> Noise <input type="checkbox"/> Vibrations <input type="checkbox"/> Leak <input type="checkbox"/> Overtemperature <input type="checkbox"/> Clogging	<input type="checkbox"/> Vertical <input type="checkbox"/> Horizontal <input type="checkbox"/> Upside-down <input type="checkbox"/> Other ..... Power:                      Rotational Speed: Current:                      Inlet Pressure: Temp 1:                      Foreline Pressure: Temp 2:                      Purge flow: Operation Time:
Describe Failure:		
Turbocontroller Error Message:		

#### ION PUMPS/CONTROLLERS

<input type="checkbox"/> Bad feedthrough <input type="checkbox"/> Vacuum leak <input type="checkbox"/> Error code on display	<input type="checkbox"/> Poor vacuum <input type="checkbox"/> High voltage problem <input type="checkbox"/> Other .....
Describe failure:	
Customer application:	

#### VALVES/COMPONENTS

<input type="checkbox"/> Main seal leak <input type="checkbox"/> Solenoid failure <input type="checkbox"/> Damaged sealing area	<input type="checkbox"/> Bellows leak <input type="checkbox"/> Damaged flange <input type="checkbox"/> Other .....
Describe failure:	
Customer application:	

#### LEAK DETECTORS

<input type="checkbox"/> Cannot calibrate <input type="checkbox"/> Vacuum system unstable <input type="checkbox"/> Failed to start	<input type="checkbox"/> No zero/high background <input type="checkbox"/> Cannot reach test mode <input type="checkbox"/> Other .....
Describe failure:	
Customer application:	

#### INSTRUMENTS

<input type="checkbox"/> Gauge tube not working <input type="checkbox"/> Communication failure <input type="checkbox"/> Error code on display	<input type="checkbox"/> Display problem <input type="checkbox"/> Degas not working <input type="checkbox"/> Other .....
Describe failure:	
Customer application:	

#### ALL OTHER VARIAN, INC.

<input type="checkbox"/> Pump doesn't start <input type="checkbox"/> Doesn't reach vacuum <input type="checkbox"/> Pump seized	<input type="checkbox"/> Noisy pump (describe) <input type="checkbox"/> Overtemperature <input type="checkbox"/> Other .....
Describe failure:	
Customer application:	

#### DIFFUSION PUMPS

<input type="checkbox"/> Heater failure <input type="checkbox"/> Doesn't reach vacuum <input type="checkbox"/> Vacuum leak	<input type="checkbox"/> Electrical problem <input type="checkbox"/> Cooling coil damage <input type="checkbox"/> Other .....
Describe failure:	
Customer application:	



## Sales and Service Offices

### **Canada** **Central coordination through:** **Varian, Inc.**

121 Hartwell Avenue  
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Toll-Free: 080 222 2452  
Fax: +82 2 3452 2451

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Fax: +886 2 2698 96782

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Fax: +44 (0) 1865 291571

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Fax: +1 781 860 5437

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Tel: (39) 011 997 9 111  
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#### **North America**

Tel: 1 (800) 882-7426 (toll-free)  
vtl.technical.support@varianinc.com

#### **Europe**

Tel: 00 (800) 234 234 00 (toll-free)  
vtl.technical.support@varianinc.com

#### **Japan**

Tel: (81) 3 5232 1253 (dedicated line)  
vtj.technical.support@varianinc.com

#### **Korea**

Tel (82) 2 3452 2452 (dedicated line)  
vtk.technical.support@varianinc.com

#### **Taiwan**

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